



National Space Science Data Center/
World Data Center A For Rockets and Satellites

86-05

(NASA-TM-89684) DOCUMENTATION FOR THE
MACHINE-READABLE VERSION OF A CATALOG OF
ULTRAVIOLET INTERSTELLAR EXTINCTION EXCESSES
FOR 1415 STARS (SAVAGE, MASSA, MEADE AND
WESSELIUS 1985) (NASA) 16 p

N90-70520

Unclassified
00/89 0251549

DOCUMENTATION FOR THE MACHINE-READABLE VERSION

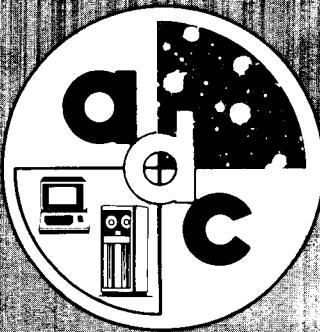
OF

A CATALOG OF ULTRAVIOLET INTERSTELLAR EXTINCTION

EXCESSES FOR 1415 STARS

(SAVAGE, MASSA, MEADE AND WESSELIUS 1985)

MAY 1989



DOCUMENTATION FOR THE MACHINE-READABLE VERSION

OF

A CATALOG OF ULTRAVIOLET INTERSTELLAR EXTINCTION

EXCESSES FOR 1415 STARS

(SAVAGE, MASSA, MEADE AND WESSELIUS 1985)

Wayne H. Warren Jr.

May 1986

National Space Science Data Center (NSSDC)/
World Data Center A for Rockets and Satellites (WDC-A-R&S)
National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

DOCUMENTATION FOR THE MACHINE-READABLE VERSION
OF
A CATALOG OF ULTRAVIOLET INTERSTELLAR EXTINCTION
EXCESSES FOR 1415 STARS
(SAVAGE, MASSA, MEADE AND WESSELIUS 1985)

ABSTRACT

The machine-readable version of the catalog, as it is currently being distributed by the Astronomical Data Center, is described. This catalog contains ultraviolet interstellar extinction excesses for 1415 stars with spectral types B7 and earlier, as derived from *Astronomical Netherlands Satellite (ANS)* five-channel UV photometry. Other data include a measure of excess extinction in the 2200-Å bump, identification of stars exhibiting peculiar UV extinction, and basic positional, photoelectric and spectral-type information.

TABLE OF CONTENTS

SECTION 1 - INTRODUCTION AND SOURCE REFERENCE	1-1
SECTION 2 - TAPE CONTENTS	2-1
SECTION 3 - TAPE CHARACTERISTICS	3-1
SECTION 4 - REMARKS, MODIFICATIONS, ACKNOWLEDGMENTS AND REFERENCES	4-1
SECTION 5 - SAMPLE LISTING	5-1

LIST OF TABLES

Table

1 Tape Contents	2-1
2 Tape Characteristics	3-1

SECTION 1 - INTRODUCTION AND SOURCE REFERENCE

A Catalog of Ultraviolet Interstellar Extinction Excesses for 1415 Stars contains interstellar extinction excesses in the ultraviolet region derived from five-channel UV photometry carried out with the *ANS* spacecraft. Filters centered at approximately 1550, 1800, 2200, 2500 and 3300 Å were used for the observations and excesses were derived for each UV wavelength with reference to the *V* magnitude of the *UBV* system. The photometric data used to derive the UV excesses are taken from the *ANS Ultraviolet Photometry Catalogue of Point Sources* (Wesselius *et al.* 1982), also available in machine-readable form from the international network of astronomical data centers (catalog #2097; Warren 1984). For additional information concerning the source data, object selection, extinction parameters, and relations among the color excesses themselves and with the excess extinction in the $\lambda 2200\text{-}\text{\AA}$ bump, the source reference should be consulted.

This document describes the machine-readable version of the catalog as it is currently being distributed from the Astronomical Data Center. It is intended to enable users to read the tape and process the data without problems and guesswork, but it is not intended to replace the original published paper, which users should study before processing the data. However, a copy of this document should be transmitted to any recipient of the machine-readable catalog originating from the ADC.

SOURCE REFERENCE

Savage, B. D., Massa, D., Meade, M. R. and Wesselius, P. R. 1985, *Astrophys. J. Suppl.* 59, 397.

SECTION 2 - TAPE CONTENTS

A byte-by-byte description of the contents of the machine-readable catalog is given in Table 1. A suggested Fortran format specification for reading each data field is included and can be modified depending upon individual programming and processing requirements (Fortran 77 character string-type formats are used). Although default (null) values are always blanks in data fields for which primary suggested formats are given as A, there are no blank fields for numerical data, as unphysical values (nines fill) are used to indicate null data.

Note: The format described below is very similar to that given on page 431 of the source reference, but some modifications were made at the ADC (with the consent of the authors) to effect uniformity.

Table 1. Tape Contents. *A Catalog of Ultraviolet Interstellar Extinction Excesses for 1415 Stars.*

Byte(s)	Units	Suggested Format	Default Value	Remarks
1- 12	---	A12	---	Object identification: catalog name and number in <i>The Henry Draper Catalogue</i> (Cannon and Pickering 1918-1924; Cannon 1925-1936; Cannon and Walton Mayall 1949), in one of the Durchmusterung catalogs, or in the catalog of Feige (1958, 1959). The catalog identification is always in bytes 1-3 and the number in bytes 4-12, and the field is entirely homogeneous so that the complete catalog can be sorted by object ID.
13	---	I1X	---	Blank
14- 15	hours	I2	---	Right ascension, α , equinox 1950.
16	---	I1X	---	Blank
17- 18	min	I2	---	α
19	---	I1X	---	Blank
20- 21	sec	I2	---	α
22	---	I1X	---	Blank
23	---	A1	---	Sign of declination, δ , equinox 1950.

Table 1 (continued)

Byte(s)	Units	Suggested Format	Default Value	Remarks
24- 25	°	I2	---	δ
26	---	1X	---	Blank
27- 30	'	F4.1	---	δ
31	---	1X	---	Blank
32- 36	°	F5.1	---	Galactic longitude, ℓ .
37	---	1X	---	Blank
38	---	A1	---	Sign of galactic latitude, b .
39- 42	°	F4.1	---	b
43	---	1X	---	Blank
44- 47	pc	I4	---	Distance estimate based on Blaauw's (1963) M_V - spectral-type calibration and $A_V = 3.1E(B-V)$.
48	---	1X	---	Blank
49- 53	mag	F5.2	---	V magnitude taken from ANS catalog.
54- 55	---	2X	---	Blank
56- 65	---	A10	---	Spectral type taken from the ANS catalog, wherein the original sources are: Jaschek (1978), Houk and Cowley (1975), Houk (1978), Buscombe (1977,1980), other sources, in the priority given; or from the HD. The format is uniform with temperature classes in byte 56, subclasses in 57-59, and luminosity classes/peculiarities in 60-65. Several incorrect spectral types in the ANS catalog have been corrected here. Whereas the luminosities and peculiarities are all in upper case in the published catalog, they have been converted to upper/lower case in this machine version according to standard notation.

Table 1 (continued)

Byte(s)	Units	Suggested Format	Default Value	Remarks
66- 70	mag	F5.2	---	Color excess $E(B-V)$.
71- 72	---	2X	---	Blank
73- 77	mag	F5.2	---	Color excess $E(33-V)$.
78	---	A1	---	Extinction parameter flag for $E(33-V)$. A colon (:) indicates a parameter derived from ANS data with 1σ statistical errors between 5% and 15%. This applies to the colon flags on all color excesses following [but not to $E(\text{Bump})$].
79	---	1X	---	Blank
80- 84	mag	F5.2	---	Color excess $E(25-V)$.
85	---	A1	---	Flag for $E(25-V)$.
86	---	1X	---	Blank
87- 91	mag	F5.2	---	Color excess $E(22-V)$.
92	---	A1	---	Flag for $E(22-V)$.
93	---	1X	---	Blank
94- 98	mag	F5.2	---	Color excess $E(18-V)$.
99	---	A1	---	Flag for $E(18-V)$.
100	---	1X	---	Blank
101-105	mag	F5.2	---	Color excess $E(15-V)$.
106	---	A1	---	Flag for $E(15-V)$.
107-108	---	2X	---	Blank

Table 1 (continued)

Byte(s)	Units	Suggested Format	Default Value	Remarks
109-113	mag	F5.2	---	Extinction parameter E (Bump), the excess extinction in the bump measured with respect to a linear (λ^{-1}) "background" extinction defined by the <i>ANS</i> photometric bands at 1800 and 2500 Å: $E(\text{Bump}) = E(22-V) - 0.3E(18-V) - 0.6E(25-V).$
114	---	A1	---	Extinction parameter flag for E (Bump), present if its photometric error is >5%. In the extreme case, a cataloged value of E (Bump) can contain a cumulative photometric error of 19%.
115	---	1X	---	Blank
116-120	---	F5.2	-9.99	Δ (Bump), measuring the deviation of the extinction curve affecting a given star from the sample mean curve, normalized by the rms scatter of the entire sample. $\Delta(x)$ values are not given for stars having $E(B-V) < 0.1$ mag, since parameters derived from stars having small color excesses are much too unreliable.
121	---	A1	---	Δ (Bump) parameter flag. A colon indicates that an $E(x)$ with photometric uncertainty >5% entered the calculation of $\Delta(x)$.
122	---	1X	---	Blank
123-127	---	F5.2	-9.99	$\Delta(15-V)$ (see bytes 116-120).
128	---	A1	---	$\Delta(15-V)$ parameter flag (see byte 121).
129	---	1X	---	Blank

Table 1 (concluded)

<u>Byte(s)</u>	<u>Units</u>	<u>Suggested Format</u>	<u>Default Value</u>	<u>Remarks</u>
130-132	---	A3	---	<p>Character codes denoting the following:</p> <p>C : cluster star in crowded field, with possible UV data contamination;</p> <p>D : star is listed in a source other than the Strasbourg <i>Catalog of Stellar Identifications</i> (CSI; Ochsenbein, Bischoff and Egret 1981) as double.</p> <p>E?: possible anomalous extinction (reddening) law;</p> <p>V : the UV results indicate variability;</p> <p>V?: suspected variable (for some of these objects, the ground-based information might be erroneously listed in the source catalogs);</p>

SECTION 3 - TAPE CHARACTERISTICS

The information contained in Table 2 is sufficient for a user to describe the indigenous characteristics of the magnetic tape version of *A Catalog of Ultraviolet Interstellar Extinction Excesses for 1415 Stars* to a computer. Information which is easily varied from installation to installation, such as block size (physical record length), blocking factor (number of logical records per physical record), total number of blocks, tape density, and coding (EBCDIC, ASCII, etc.) is not included: this information should always be supplied if secondary tape copies of the catalog are transmitted to other users or installations.

Table 2. Tape Characteristics. *A Catalog of Interstellar Extinction Excesses for 1415 Stars.*

NUMBER OF FILES	1
LOGICAL RECORD LENGTH (BYTES)	132
RECORD FORMAT	FB*
TOTAL NUMBER OF LOGICAL RECORDS	1415

* Fixed block length (last block may be short)

SECTION 4 - REMARKS, MODIFICATIONS, ACKNOWLEDGMENTS AND REFERENCES

A magnetic tape containing *A Catalog of Interstellar Extinction Excesses for 1415 Stars* was kindly supplied by the authors on 24 June 1985, along with a preprint of the published paper and a physical tape description. The entire catalog was transferred to disk storage and compared against the printed catalog. The following modifications were made to the format in order to make it more uniform and compatible with other machine-readable catalog formats:

1. The object identifications were homogenized and the catalog codes (HD, BD, CD, FEI) added. These are now entirely uniform and all numbers are right justified so that the whole catalog can be sorted by object ID if desired.
2. Signs were added to positive values of δ° ; minus signs were removed from δ' ; minus signs were missing from declinations in the -00° zone. These stars were all looked up ($+00^\circ$ and -00°) in other catalogs and appropriate signs added. (This error does not occur in the published catalog.)
3. Signs were also added to positive values of galactic latitude, to Δ (Bump) and to $\Delta(15-V)$.

ACKNOWLEDGMENTS

Appreciation is expressed to the authors for supplying the catalog on magnetic tape and to M. R. Meade for correspondence regarding the proposed changes. The authors also kindly reviewed a draft copy of this document prior to its final printing for distribution with magnetic tape copies of the catalog.

REFERENCES

Blaauw, A. 1963, in *Stars and Stellar Systems*, Vol. 3, *Basic Astronomical Data*, ed. K. Aa. Strand (Chicago: University of Chicago Press), p. 383.

Buscombe, W. 1977, *MK Spectral Classifications, Third General Catalogue* (Evanston, Illinois, USA).

Buscombe, W. 1980, *MK Spectral Classifications, Fourth General Catalogue* (Evanston, Illinois, USA).

Cannon, A.J. 1925-1936, *The Henry Draper Extension*, *Ann. Astron. Obs. Harvard College* 100.

Cannon, A. J. and Pickering, E. C. 1918-1924, *The Henry Draper Catalogue*, *Ann. Astron. Obs. Harvard College* 91-99.

REFERENCES (concluded)

- Cannon, A. J. and Walton Mayall, M. 1949, *The Henry Draper Extension, The Annie J. Cannon Memorial Volume*, Ann. Astron. Obs. Harvard College 112.
- Feige, J. 1958, *Astrophys. J.* 128, 267.
- Feige, J. 1959, *Astrophys. J.* 129, 600.
- Houk, N. 1978, *Michigan Catalogue of 2-Dimensional Spectral Types for the HD Stars*, Vol. 2, Zones -52° to -40° (Ann Arbor: University of Michigan).
- Houk, N. and Cowley, A. P. 1975, *Michigan Catalogue of 2-Dimensional Spectral Types for the HD Stars*, Vol. 1, Zones -89° to -53° (Ann Arbor; University of Michigan).
- Jaschek, M. 1978, *Catalogue of Selected Spectral Types in the MK System*, Bull. Inf. Cent. Données Stellaires No. 15, p. 121.
- Ochsenbein, F., Bischoff, M. and Egret, D. 1981, *Astron. Astrophys. Suppl.* 43, 259.
- Savage, B. D., Massa, D., Meade, M. R. and Wesselius, P. R. 1985, *Astrophys. J. Suppl.* 59, 397.
- Warren, W. H. Jr. 1984, Documentation for the Machine-Readable Version of the *ANS Ultraviolet Photometry Catalogue of Point Sources* (Wesselius et al. 1982) NSSDC/WDC-A-R&S 84-10.
- Wesselius, P. R., van Duinen, R. J., de Jonge, A. R. W., Aalders, J. W. G., Luinge, W. and Wildeman, K. J. 1982, *ANS ultraviolet photometry, catalogue of point sources*, *Astron. Astrophys. Suppl.* 49, 427.

SECTION 5 - SAMPLE LISTING

The sample listing given on the following pages contains logical data records exactly as they are recorded on the tape. Sample records for objects at the beginning and the end of the data file are listed. The beginning of each record and bytes within the record are indicated by the column heading index across the top of each page (digits read vertically).

LISTINGS OF RECORDS FROM TAPE FILE

TAPE FILE NAME: UV Ext Excesses 1415 *s
RECORDS 1381 TO 1415

TAPE FILE 61
RECORD LENGTH 132 BYTES
TWO-DIMENSIONAL